Gimme an R!

Common Terms in Ed Tech Research

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Subject: Research terminology

Standards: *NETS•T* II; *NETS•A* II (http://www.iste.org/standards/)

Re-SEARCH! Re-SEARCH! Woo-hoo! Let's hear it for research!

Okay, this is probably not something you'd expect to hear at your local sports bar or even at NECC 2005. Let's face it: research is just not something that most people get excited about. It can be complicated, abstract, and downright boring. When it comes to educational technology research, most of us would rather just have the bullet points—*tell me what I need to do to make X or Y happen in my classroom.* Or worse, some would rather not know anything about the latest research because we fear it might be contrary to the way we've been teaching for so long.

Well, let's all just take a deep breath, step back for a second, and relax. Research doesn't have to be so intimidating, confusing, or boring. Perhaps it will help if you just understand what the heck researchers are saying, what their terminology is. Let's take this month's Research Windows (RW) column to cover some of the common terms.

Research Versus Evaluation

What is the difference between research and evaluation? We hear about them quite often, and in today's heavily grant-funded educational climate, most teachers and/or their students have been the subjects of either research or evaluation (or both) at one time or another.

I can't give you a definitive answer to this question, because it's one that researchers and evaluators have been kicking around for decades. But I can give you a common perspective on the two. It's important to note that research and evaluation are not necessarily the same thing. Evaluation has at its heart determining whether grant or project goals have been met. To the degree that those goals may not have

been met (yet), evaluators usually attempt to specify challenges and barriers to success. From that information, the grant's **principal investigator** (i.e., the person in charge of the grant), the school principal, or the classroom teacher can make informed decisions about how to close the gaps in the current project and how to avoid such problems in the future. So, in this sense, *evaluation equals action.*

The ultimate outcome of research is to understand what, how, and ultimately why. Researchers often begin with the exploration and description of a situation. But the quest for explanation, cause and effect, is what drives the researcher. In this sense, *research equals knowledge.*

In addition, much **empirical research**—that is, research based on observation of the world and collecting data from that observation—relies on the concept of **reliability,** that what is studied in one research project could be repeated in other research projects given the same circumstances. For example, if I were a university professor conducting research on the effects of socioeconomic status on math and reading test scores in Maryland, I would use a **research design** (a plan for the research) other researchers could replicate in other states with similar data.

Evaluation is primarily concerned with the organization's own project and its success, but not so much with ensuring that the project could be replicated. This is not to say that evaluators use wacky research methods that can't be used anywhere else. On the contrary, most evaluators are trained in common research methods and will use a research design that can be used elsewhere. But replicability is not the number-one goal.

Now, these two paradigms—pure research and pure evaluation—are often in accord with one another. Evaluating a project's shortcomings in its goals will always require some understanding of why, of what caused a certain expected or unexpected outcome. Once the *why* is pinned down, hopefully we'll have a good idea of *how* to make changes. Likewise, research is often conducted with the eventual goal of inducing change.

Okay, so next question: what kinds of research designs are commonly used? There are a lot of them, varying in their use from field to field, but let's stick with common methods in educational research.

Common Qualitative Methods

One of the most common types of educational inquiry is **field research** (literally, "research in the field" just like a journalist would be "in the field"). In other words, the researcher goes to a school to find out what is happening. Field research makes up the bulk of **qualitative analysis** (research based on understanding the nuances and details of a situation) in educational research. Qualitative research is not focused on counting or classifying events, but on capturing descriptive accounts of them.

Many folks will use the term **ethnography** interchangeably with field research, but in fact, ethnography is merely one form of field research. It is based heavily in understanding cultures different from one's own (which is why it's a common method among anthropologists). So, unless you're planning to study educational technology in a vastly different culture than your own, you won't see it much in Ed Tech research.

Qualitative analysis (research based on understanding the nuances and details of a situation) in educational research can be broken down basically into two categories: observations and interviews. (Yes, there are many subtleties in types of qualitative methods, but let's keep this simple.) Many researchers will use the term **participant observation** to describe their fieldwork. However, participant observation is actually a continuum of fieldwork from the "complete observer" at one end to the "complete participant" at the other. As you might expect, most research falls somewhere between the two.

In education, the observer typically monitors or studies classrooms and the school environment, looking for patterns in the ways students behave, in how teachers present material, and so on. Any time you've had an outside researcher come sit or stand at the back of your classroom simply watching, maybe taking a few notes, that person was likely conducting participant observation, but at the observer end of the scale.

Now let's focus more on a combination of participation and observation, where the researcher not only observes what is happening, but actually participates in it, too. A school principal may decide that she'd like to lead a few classes' work in the school's computer lab, giving the students an assignment to use the Web to research a particular topic, and then observing how well they accomplish their task, taking notes on their work, and perhaps providing some overall group instruction along the way. This is participant observation.

Yes, there is concern that by participating, the researcher ultimately changes the situation he or she is researching. This is inevitable, really, but the difference between valuable and poor participant observation is how important those changes are. The quality researcher will attempt to minimize any changes in the setting that might directly affect what is being studied. In the example above, the principal should not help particular students more than others in their

More on Research Terminology

The Web contains a wealth of information to help you learn more about reading educational research. Visit these sites for information and further links.

American Educational Research Association: http://www.aera.net

American Evaluation Association: http://www.eval.org/EvaluationLinks/Collections.htm

Education Resources Information Center: http://www.eric.ed.gov/. Use this newly refurbished site to find educational research and other such publications.

American Sociological Association—Available Data Resources: http://www.asanet.org/student/data.html. This page provides a list of data resources for social research, many of which apply to education.

Education Directorate of the American Psychological Association: http://www.apa.org/ed/

Web searches. That would be interfering in the outcome of the study. The fact that the principal is working with (and observing) a group of students may also have an effect on their behavior that is not normally there—we hope they shape up a bit. But it probably won't interfere much with how well students conduct Web searches. The bottom line for the participant researcher is: be aware of yourself. Don't let your own opinions, preferences, or habits interfere in the outcome of the study.

Participant observation by itself is often limited in how much one can understand simply by watching. Other times, the researcher has to talk to the teacher or the students (what a concept!). In this case, he or she would be conducting interviews, where the most common types are **IDIs** (in-depth interviews) and **focus groups.** IDIs are used to ask questions of the subject (the person being interviewed) and to probe (ask follow-up questions based on his or her previous answers) for more information. Focus groups allow for the same kind of question-and-probe method, but they also allow the participants to react to each other's statements. Focus groups can be quite valuable in that the participants themselves become, in essence, extra researchers, making comments, asking questions, and building on what others have said to create a complete picture of the topic at hand. One note of warning, though, is that focus groups are not a good idea when the topic is of a sensitive nature, any time when participants might not be comfortable sharing some of their experiences with a group. In such a case, IDIs are preferable; they should be kept confidential and treated anonymously when the researcher presents a report. It is common to use these two methods in combination.

Common Quantitative Methods

Although participant observation and interviews comprise major qualitative analyses in education, it is often necessary to provide numerical evidence in one's research. Thus we come to **quantitative analysis** (research based on counting the number of times something happens.) Most of you are probably all too familiar with survey research, for it can sometimes feel like the educational community is being surveyed to death. Surveys can be broken down into four basic types:

Mail surveys are those paper surveys you receive in the mail, fill out, and send back. They're valuable in that you can reach just about any person, anywhere, as long as they have a mailbox. But they can also be expensive, especially when your **sample** (the group of people being studied) is large: not only do you have to pay for printing, stuffing envelopes, and postage, but you have to provide return, postage-paid envelopes if you expect to get any surveys back. Some kind of incentive, such as coupons or a prize drawing, can help increase your **response rate** (the percent of all the surveys you send out that you actually get back).

Intercept surveys are also pencil-and-paper surveys, but are usually conducted by someone else on the **respondent** (the person answering the questions). That someone else holds a clipboard, asks questions of the respondent, and makes notes of his or her responses. If you've ever visited a mall during peak shopping periods, you've probably been asked at least once, by someone holding a clipboard, if they could have a moment of your time. This person was likely conducting an intercept survey. Intercept surveys can be helpful if the topic is difficult to explain, because the person with the clipboard usually has a little bit of leeway in rephrasing questions that a respondent doesn't understand. (They will likely have a set list of phrases or words that can be used to explain the question, so the surveys can be replicated.)

Telephone and **electronic** or **Web-based surveys** leave the clipboard behind in favor of computers.

Both share the idea that answers to questions can be put directly into a computer for analysis, which can save a lot of time. Mail and intercept surveys must be keyed into a computer later, although this is even changing with intercept surveys as handhelds replace the clipboard. Unfortunately, telephone surveys are losing their effectiveness in the general public because telephone solicitors and "push pollsters" have ruined the survey-taker's reputation by using some unethical methods. Add in the fact that the public is generally inundated with unwanted phone calls of any type, and you can see why telephone surveys are losing their effectiveness.

Web surveys may seem like a good alternative, because the invitation to take a survey can be e-mailed or placed on a Web site, allowing potential respondents to decide on their own time whether to participate. Unfortunately, they, too, have a couple of shortcomings. First, e-mail invitations sent to people who aren't expecting them could be considered spam. Second, not everyone has access to a computer with an Internet connection, or at least not necessarily at a time when it's convenient to take a survey. So for now, Web surveys best serve the researcher when he or she has a predefined sample and when it is known that each person in the sample has free and open access to a computer with an Internet connection.

Researchers also use **unobtrusive research** (data collection that doesn't require the researcher to bother anyone) to gather information. In education, the two most common types of unobtrusive research are **existing data sources** and **content analysis.** A typical analysis of an existing data source would be pulling students' test scores from across a school district and comparing average scores across schools. Only one or two people have to be bothered with this, and they usually work in the district's assessment or information technology departments. Content analysis is like existing data sources research in that the researcher is looking at something that already exists, such as textbooks, student artwork, or teaching portfolios. The researcher then analyzes the content of these **artifacts** (the things being studied in content analysis), looking for common patterns of language or expression, striking dissimilarities among artifacts, etc.

Quasi-Experimental and Experimental Research

Educational researchers have heard an awful lot about these last two types of research recently. In true **experimental research,** the researcher takes the **subjects** (those being studied, for example, students), randomly assigns them into two (or more) groups, puts them in similar surroundings with similarly trained teachers, and asks them at some specified point in time to take a test—let's say, a math test. The difference between the two groups is that before taking the math test, the treatment group would be given the thing the researcher wanted to know about—new computers or new math software, for example—while the **control group** would learn math from the textbook or whatever preexisting instructional method was in use at the school. The new software or new computers are known as the **treatment** or the **intervening variable.** (Sometimes differing surroundings or differently trained teachers are the intervening variables.) The goal, of course, is to see if the new software produced higher scores on the math test than simply learning from the textbook.

But educational settings are rarely this neatly defined, and there is an ethical dilemma in providing one type of instruction or resource to one group but not to another. So we usually see **quasi-experimental research** in education. In such a case, two groups are still compared based on a treatment, but the students are not randomly selected and the treatment is often only available to one group. For example, if a school gets a grant for new computers, we might compare its average math test scores in each grade to the average scores in each grade from a similar school that did not get such a grant. If no other school is available for comparison, we might make comparisons over time using a **pretest/posttest** design. Supposing that the school's fourth graders all learned math on new computers this year, we might compare their math test scores from the fall and spring when they were in third grade with their scores in the fall and spring this year. If their scores increased by 5% in third grade, but by 15% over the course of fourth grade, we can conclude that the computers may have had an effect. Note that it is *may have had* not *had,* because it's difficult to control for every other factor that might affect changes in math scores. Still, it's reasonable to conclude that the computers had some effect, and our quasi-experimental design has yielded some worthwhile conclusions.

With these tools on hand, it's my hope that you'll return to the RW column in future issues of *L&L,* prepared to gain some insight into how educational research affects your own work. Or at the very least, your newfound knowledge will make you the life of the party.

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